** MACHINE TRANSLATED DOCUMENT **

** TRADUZIONE AUTOMATICA **

Description

USE OF A MADRELEGA FOR THE PRODUCTION OF A SILVER alloy for forming chains by laser welding

Field of application

[0001] The present invention is applicable in the field of jewelry and particularly relates to the use of a madrelega for the production of a silver alloy by 800 or 925 mils intended for forming chains by laser welding.

[0002] The invention also relates to the use of silver alloy by 800 or 925 mils above for the manufacture of chains by laser welding.

Definitions

[0003] In the present text, by the term "title" or derivatives of an alloy or of an object in precious term silver, unless otherwise indicated, the minimum concentration of silver in the alloy or object precious. Typically, the title of the silver and expressed in thousandths of mass on mass.

[0004] For Europe, the reference standard for the titers of alloys of precious metal and the DIN EN 29202.

[0005] In the present text, by the term "madrelega" or derivatives are intended, unless there are indications to the contrary, a blank intended to be bound with silver to the production of silver alloys.

[0006] In the present text, by the term "alloy" or derived means, unless otherwise indicated, a product derived from the combination of a madrelega and silver crude state, that is in output from the process of alloying between silver and madrelega.

[0007] In the present text, by the term "consists essentially" or derived associated with a composition or product of interest consisting of two or more components is meant, unless there are indications to the contrary that that product or composition consists of components listed (that is that the total of the components listed are 100% of the composition or product), minus the impurities.

[0008] In the present text, by the term "percentage by weight" or "% by weight" or derived means, unless otherwise indicated, the percentage by weight of a component of interest with respect to the total weight of the composition in which the component of interest is included.

[0009] In the present text, by the term "grain refiner" or derived means, unless otherwise indicated, a compound or element poorly soluble in the alloy is capable of promoting the formation of a large number of crystals minutes, rather than a few large grains dimensions. A fine grain alloy generally has better mechanical properties is often a high resistance to the corrosion.

[0010] In the present text, by the term "deoxidizing agent" or derivatives are intended, unless there are indications to the contrary a compound or element able to capture the oxygen present in the alloy or madrelega in the molten state to prevent it combines with its functional elements, by modifying the composition, the purity and the properties optomeccaniche.

[0011] In the present text, by the term "chain made by laser welding" or derived means, unless otherwise indicated, a semifinished product deriving from the treatment by plastic deformation of an alloy is composed of a plurality of annular elements linked together, each of which has a closure produced by laser welding.

[0012] In the present text, by the term "object precious" or derived means, unless otherwise indicated, a finished product of any shape and size, deriving from the treatment of a chain or other semifinished product which requires a laser weld.

State of the art

[0013] are known precious objects, such as for example et cetera or bracelets, deriving from the processing of a chain. For linking together the articulated elements of the chain must be fixedly join the open ends of each.

[0014] In the case of chains in silver alloy, the processes of joining by laser welding suffer from traditionally of poor absorption of the radiation, which prevents a good melting the ends free. Therefore, the welds are porous and surface, with poor mechanical properties.

[0015] In order to obviate this drawback, additional surface treatments are carried out (oxidation, painting, etc.) , which lead to the formation of thin layers having a highest adsorption of the substrate which is then heated in an indirect manner.

[0016] However, notwithstanding these expedients, the weld joint is always affected by significant shortcomings of porosity and heterogeneity.

[0017] A process is known from US6168071 junction of the silver alloy by diffusion.

[0018] By W02013128413 silver alloys are known for rapid prototyping processes for addition of material.

Presentation of the invention

[0019] object of the present invention is to obviate the above mentioned drawbacks by providing a madrelega alligabile with silver to obtain a silver alloy intended to provide a chain by laser welding in which the weldings have good mechanical properties.

[0020] Another object of the invention is to provide an madrelega alligabile with silver to obtain a silver alloy intended to provide a chain by laser welding in which the welds are homogeneous.

[0021] Another object of the invention is to provide an madrelega alligabile with silver to obtain a silver alloy intended to provide a chain by laser welding in which the welds are essentially free of porosity.

[0022] Another object of the invention is to provide an madrelega alligabile with silver to obtain a silver alloy intended to provide a chain by laser welding that allows to increase the life of the machine which carries out the laser welding.

[0023] This and other objects are achieved by the use of a madrelega to produce a silver alloy in the construction of a chain by laser welding, madrelega essentially consisting of:

(A) from 80% to 95% by weight of copper (Cu);

(B) from 0% to 10% by weight of zinc (Zn);

(C) from 0.045 % to 6% by weight, preferably from 1.5 % to 4 % by weight of at least a metalloid selected from the group consisting of: germanium (Ge), silicon (Si), boron (B) , Tellurium (Te), phosphorous (P) or selenium (If), preferably selected from the group consisting of: germanium (Ge)and/or silicon (Si)and/or boron (B) or a mixture of two or more of them;

(D) from 0% to 0.25 % by weight, preferably from 0.01 % to 0.25 % of at least a grain refiner selected from the group consisting of: iridium (Ir), ruthenium (Ru), rhenium (Re), cobalt (Co)and rhodium (Rh), preferably

selected from the group consisting of: iridium (Ir)and/or ruthenium (Ru);
(E) from 0% to 10% by weight, preferably from 4% to 8% by weight, of tin (Sn);

[0024] in which the weight percentages are weight percentages with respect to the total weight of madrelega.

[0025] Preferably, the madrelega can be in the form of drops. For the purpose, may be prepared in a per se known manner for blasting.

[0026] In a preferred but not exclusive embodiment to madrelega can be added, during the melting step, a small amount of lithium (about 0.01 %)with the purpose of deoxidise the melting bath.

[0027] It can be understood that such element, while added with components (A) to (E) above, will not part of the final composition of the madrelega or may be present as impurities.

[0028] Advantageously the chain mentioned above may be processed to obtain one or more precious objects such as et cetera, bracelets or the like.

[0029] In a further aspect of the invention , it is provided the use of a silver alloy by way 925 or 800 mils consisting essentially of:

- at least the 92.5 % of silver (Ag), preferably from 92.5 % to 93.5 % of silver (Ag), in the case of alloy by way 925; or at least 1 ' 80% of silver (Ag), preferably from 80 % to 81 % of silver (Ag), in the case of alloy by way 800;
- the remaining part of a madrelega according to one or more of the preceding claims.

[0030] Thanks to the above characteristics, the invention allows to obtain chains with closures which have good mechanical properties.

[0031] In particular, the welds are homogeneous and essentially free of porosity.

[0032] Moreover, thanks to the present invention it is possible to lower the power of the laser which carries out the welding of 25 - 30 %, with evident advantages in terms of mean value of the life of the same.

[0033] The invention will be better understood thanks to the following examples which are provided for purely illustrative purposes and are not limitative of the invention.

Example 1 - of preparation examples madreleghe

[0034] were prepared various examples of madreleghe, in accordance with the following table 1.

[0035] The madreleghe of the samples 1-8 were prepared by process of blasting.

[0036] The various elements in the weight ratios reported above were inserted in a crucible protected by argon and then it has been reached the temperature of about 1200 °C for the homogenization. Before pouring is inserted a small amount of lithium (0.01 %)with the purpose of deoxidise the molten bath. Finally, the melt is passed through of the holes of about 1.2 mm placed in the die to cast so in a bath of water/alcohol, in such a way as to form a grit in which the distribution of the diameters of 1 mm to 5 mm

Tabella 1

	Es 1	Es 2	Es 3	Es 4	Es 5	Es 6	Es 7	Es 8
(A) Cu	89,148	90,572	85,623	89,929	84,219	85,649	87,007	88,717
(B) Zn	7,13	7,14	7,15	7,14	7,14	7,14	7,14	7,14
(C) Si	3,572	2,143	1,43	-	1,43	1,43	-	2,857
(C) Ge	-	-	-	2,86	1,43	-	5,71	-
(C) B	-	-	-	-	-	-	-	1.286
(D) Ir	-	-	-	0,071	-	-	0,143	-
(D) Ru	0,15	0,145	0,067	-	0,071	0,071	-	-
(E) Sn	-	-	5,73	-	5,71	5,71	-	-

LEGENDA -> Es: Esempio;

Example 2 - Preparation of

[0037] madreleghe alloys for each of the examples 1-8 in Table 1 were made various examples of silver alloys by 925 or 800.

[0038] For this purpose, each madrelega was alloyed hot-with silver in a weight ratio according to the desired count.

[0039] In particular for the alloys of silver by 925 the weight ratio of silver and madrelega and of 925 : 75 (92.5 % silver, 7.5 % madrelega), for those by 800 and 800 : 200 (80% silver, 20% madrelega).

[0040] Once alloyed hot-with silver, each alloy will have a shape of a bar.

[0041] For each alloy 20 kg of madrelega and silver in suitable weight ratios were introduced in a crucible protected by argon of a strip caster to continuous casting, and then it has been reached a temperature of 928 °C.

[0042] It is then poured the material through a die obtaining a bar.

Example 3 - Preparation of a chain by laser welding

[0043] the bars obtained by means of fusion to the continuous casting of the previous example , the diameter of about 10 mm, were laminated in a per se known manner in a rolling train to the extent of 1.5 mm. During the rolling annealings were carried out at 600 °C.

[0044] The yarn thus obtained was inserted in a machine for chain of known type with laser incorporated. In a per se known manner, the machine cuts the yarn in segments of about 5 mm and folds, laser welding the free ends so as to form a plurality of annular elements linked together.

[0045] The chain thus obtained was then finished by tumbling with ceramic and polished.

Example 4 - Preparation of a catenin

[0046] by the chain obtained by the processing as above were cut segments of about 45 cm. To each of these was added the closure to form a catenin.